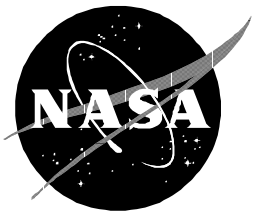

National Aeronautics and Space Administration

APRIL 7, 2000
NRA 00-OSS-04

RESEARCH ANNOUNCEMENT

CHANDRA X-RAY OBSERVATORY (CXO) GENERAL OBSERVER PROGRAM

Proposals Due: **June 1, 2000**

OMB Approval No. 2700-0087

CHANDRA X-RAY OBSERVATORY (CXO)
GENERAL OBSERVER PROGRAM

Cycle 2

NASA Research Announcement Soliciting
Proposals for Basic Research

NRA-00-OSS-04

Release Date: April 07, 2000
Proposal Due Date: June 01, 2000

Office of Space Science
National Aeronautics and Space Administration
Washington, DC 20546-0001

CHANDRA X-RAY OBSERVATORY
GENERAL OBSERVER PROGRAM
Cycle 2

This NASA Research Announcement (NRA) solicits basic research proposals for participation in the National Aeronautics and Space Administration (NASA) program for the conduct of space science observations and subsequent analysis of the resultant scientific data from the *Chandra X-ray Observatory* (CXO). The primary goal of the *Chandra* mission is the investigation of the nature and physics of astrophysical objects as revealed through their X-ray emission.

The observations selected as a result of this NRA will be implemented beginning about November 1, 2000 and will last for approximately 12 months. Based on the Chandra Observing Policy, 74% of the on-target observing time during this cycle is available. For General Observations – 70% for the first 9 months, 85% thereafter. The remainder of the time is set aside for Chandra calibration, Chandra Science Center Director's Discretionary Time, and the Guaranteed Time Observations (GTO). It is anticipated that further opportunities for participation in the Chandra General Observer (GO) Program will be announced annually.

Participation is open to all categories of organizations, both domestic and foreign, including educational institutions, profit and nonprofit organizations, NASA Centers, and other Government agencies. Proposals may be submitted at any time during the period ending per the schedule below; those received after that date will be held for the next review cycle. Letters of Intent to Propose are not required. Proposals will be evaluated by a scientific peer-review panel with a goal of announcing the selections approximately three months after the proposal due date. A detailed schedule specifying proposal deadlines and important mission milestones is provided in Appendix C to this NRA.

Proposers for new observations whose investigations are selected will have proprietary use of their data for 12 months after receipt of the data after which time the data will be placed in a public data archive that is accessible to other interested investigators. There are no proprietary restrictions on data once placed in the archive. Thus, scientists who wish to use the archives, but do not require funding, need not propose for this opportunity.

Funds for awards under this NRA are expected to be available subject to the annual NASA budget cycle. The Government's obligation to make awards is contingent upon the availability of appropriated funds from which payment for award purposes can be made and the receipt of proposals which the Government determines are acceptable for award under this NRA. The total amount of funding available for the

support of General Observations for the present observing opportunity is anticipated to be $10 million. It is anticipated that as many as 250 investigations may be recommended for selection.

The proposal review will be conducted in two stages. During the first stage, the scientific and technical merits of the proposed investigation will be reviewed. For proposals that request observations, the appropriateness of using *Chandra* to achieve the scientific objectives, as compared to other available observatories, will also be considered. For proposals for archival research the merit of providing funding for the proposed investigation will also be considered. The review panel will provide NASA with a rank-ordered list of proposals. In the second stage of the selection process, investigators whose proposals have been identified for continued consideration will be asked to submit a proposed budget to support their investigation and will also be given the opportunity to submit an education and public outreach (E/PO) proposal. A subset of the original review panel will be convened approximately 6-8 weeks after the initial review to evaluate the proposed budgets. A review will also be carried out of the proposed E/PO program. Based upon overall consideration of both scientific and cost factors, as well as ratings of the proposed E/PO program, the *Chandra* Program Scientist will recommend a set of proposals for consideration by the Selecting Official for final selection and award. Further information on the proposal evaluation and selection process is given in Appendix C, section C.3.

Further details relevant to the *Chandra* General Observer Program are included in the Appendices that are listed below. This NRA, its Appendices, and relevant reference documents may be downloaded directly via the World Wide Web, or via anonymous file transfer protocol (ftp) at the address given below. Individuals not having access to the Internet may request paper copies of this
Announcement and reference documents at the addresses given below.

Appendix A gives an overview of the mission and describes the observing opportunity. Appendix B gives the general instructions for responding to NASA Research Announcements. Appendix C, which supersedes and augments Appendix B, provides additional, NRA-specific information on proposal submission and subsequent evaluation, selection, and implementation. The information in Appendix C applies to this NRA only. Appendix D contains the forms and instructions needed to prepare proposals in response to this NRA. Appendix E gives instructions for finding lists of all planned and accomplished Cycle 1 observations and planned Cycle 2 GTO and calibration observations.

Education and the enhancement of public understanding of space science are considered to be vital and integral parts of all NASA space science missions and research programs. NASA OSS encourages proposers to this NRA to include an Education/Public Outreach (E/PO) component with their research proposal. Because of the anticipated large oversubscription in observing time requests in

Stage 1 proposals, we are only asking for E/PO components to be submitted in conjunction with the second stage of the review process, The OSS E/PO program and instructions for submitting an E/PO proposal are described in Appendix F.

Technical and reference documents are available interactively from the *Chandra* X-ray Center over the World Wide Web, for download via the WWW or anonymous ftp, and in hard copy by request at the address below. The *Chandra Observatory Description and Proposer's Guide* contains an overview of the detector capabilities as well as information on proposing for *Chandra* observing time (e.g., instructions for assessing feasibility, instrument summaries, constraint summaries, etc.).

IDENTIFIER:	NRA 00-OSS-04
PROPOSAL DUE DATE:	June 01, 2000
NUMBER REQUIRED:	The complete stage 1 proposal should be submitted electronically. One paper copy of the stage 2 proposal with institutional signatures will be required from both U.S. and foreign institutions.
SELECTING OFFICIAL:	Director Research Program Management Division Office of Space Science
SUBMIT PROPOSALS TO:	(WWW): <http://asc.harvard.edu/soft/RPS/Chandra/Chandra.html> **OR** (email): rps@head-cfa.harvard.edu **OR** by mail (only for proposers without Internet access): *Chandra* X-ray Center Mail Stop 4 Smithsonian Astrophysical Observatory Ref: NRA-00-OSS-04 60 Garden Street Cambridge, MA 02138-1516 USA

OBTAIN ADDITIONAL PROGRAMMATIC INFORMATION FROM:	Dr. Alan Bunner Science Program Director Code SA National Aeronautics and Space Administration Washington, DC 20546-0001 USA Tel: 202-358-0364; FAX 202-358-3096 E-mail: alan.bunner@hq.nasa.gov
DIRECT TECHNICAL QUESTIONS TO:	CXC User Support Group (WWW): <http://asc.harvard.edu/> **OR** (e-mail): usupport@cfa.harvard.edu **OR** by mail/phone/FAX: *Chandra* X-ray Center Mail Stop 4 Smithsonian Astrophysical Observatory 60 Garden Street Cambridge, MA 02138-1516 USA Tel: 617-495-7282; FAX: 617-495-7356
RETRIEVE APPENDICES ELECTRONICALLY FROM:	(WWW): http://spacescience.nasa.gov select ``Research Opportunities" **OR**: (WWW): http://asc.harvard.edu **OR** (Anonymous ftp): sao-ftp.harvard.edu directory <pub>

NASA appreciates your interest and cooperation in participating in the *Chandra* General Observer Program.

Alan N. Bunner
Science Program Director
Structure and Evolution of the Universe
Office of Space Science

Appendices:

A: *Chandra* Mission Description

B: Guidelines for Responding to NASA Research Announcements for Solicited Basic Research Proposals

C: Additional Information Regarding Proposal Submission, Evaluation, Selection, and Implementation Specific to the *Chandra* Mission

D: Instructions for Filling in *Chandra* Proposal Forms

E: Instructions for obtaining the details of the Cycle 1 observing program and those preplanned for Cycle 2.

F: The OSS Education/Public Outreach program

Chandra Mission Description

A.1 Mission Overview

The *Chandra* X-ray Observatory (CXO) was launched on the Space Shuttle Columbia on July 23, 1999. Cycle 1 observations are expected to be completed on or about November 1, 2000. This NRA solicits proposals for Cycle 2 of the mission which will last nominally 12 months. The amount of observing time (time on target) available to be allocated under this NRA is 13.6 Msec.

The *Chandra* program is sponsored by NASA's Office of Space Science (OSS) and managed by the NASA Marshall Space Flight Center (MSFC). The prime contractor responsible for the spacecraft and integrating the CXO was TRW. The four science instruments were developed by the following science and engineering teams: The Advanced CCD Imaging Spectrometer (ACIS) – the Pennsylvania State University in collaboration with the Massachusetts Institute of Technology (MIT); The High Resolution Camera (HRC) - the Smithsonian Astrophysical Observatory (SAO); The Low Energy Transmission Grating (LETG) – the Scientific Research Organization of the Netherlands (SRON) in collaboration with the Max-Planck-Institut für Extraterristriche Physik (MPE); and the High Energy Transmission Grating (HETG) – MIT.

Chandra has as its primary mission the study of the structure and emission properties of astrophysical sources of high energy radiation. The scientific objectives will address questions concerning the fundamental physics and astrophysics of such systems, including, but not limited to:

- accurate measurement of the discrete X-ray source contribution to the X-ray background;
- galaxy and galaxy cluster structure and evolution, and properties of X-ray sources in other galaxies;
- characteristics of active galactic nuclei, starburst galaxies, and quasars; in particular, emission mechanisms, time variability, jets, and lobes;
- supernova remnant abundances, structure, and central neutron stars or pulsars;

- interstellar hot plasma abundances, temperatures and X-ray ionization states;
- phase-resolved spectroscopy of compact objects to understand the emission mechanisms; and
- the properties and structure of stellar coronae.

A.2 Science Payload

Chandra is comprised of three major components: the spacecraft, the X-ray telescope, and the Science Instrument Module (SIM) containing the focal plane instruments. The spacecraft provides the power, attitude control, communications, and support for the telescope and instruments.

The X-ray telescope consists of the optical bench, the High Resolution Mirror Assembly (HRMA), and two objective transmission gratings, the High Energy Transmission Grating (HETG) and the Low Energy Transmission Grating (LETG). The HRMA is a Wolter Type I, 1.2 m diameter, 10 m focal length, iridium-coated mirror. At 1.5 keV, >85% of the imaged, aspect-corrected X-rays are contained in a circle of diameter ~1.0 arcsecond.

Chandra carries two scientific instruments in the focal plane: (i) the Advanced CCD Imaging Spectrometer (ACIS); and (ii) the High Resolution Camera (HRC). The focal plane instruments are mounted in the SIM. The SIM provides three functions: launch lock, translation (to interchange the two focal plane instruments), and focus. Only one of the two focal plane instruments can be placed in the telescope's focus at a time; proposals that request simultaneous observations with both instruments cannot be accommodated.

The ACIS has two arrays of CCD's, one (ACIS-I) optimized for imaging wide fields (16'x16') the other (ACIS-S) optimized as a readout for the HETG transmission grating. One chip of the ACIS (S3) can also be used for on-axis imaging and offers the best energy resolution of the ACIS system. The ACIS-I and the four of the six CCDs comprising the ACIS-array are front-illuminated devices. These units currently suffer from position dependent energy resolution, which is described in some detail in the *Proposer's and Observatory Guide* available at the Chandra X-Ray Center (http://asc.harvard.edu/) and at the address given in the Solicitation Announcement. (<http://asc.harvard.edu/>) and at the addresses given in the Solicitation Announcement.

The HRC is comprised of two microchannel plate imaging detectors, and offers the highest spatial (<0.5”) and temporal (16 micro-sec) resolution. The HRC-I is a single microchannel plate and has a field of view of 31’× 31’. The HRC-S consists of three contiguous segements, tilted slightly in order to conform to the Rowland circle of the LETGS. The background rate is quite different in the two devices, being much larger in the HRC-S, and is detailed on the *Proposer’s and Observatory Guide*.

The High-Energy Transmission Grating (HETG) is optimized for high-resolution spectroscopy over 0.4-10 keV. Two types of gratings are mounted in the HETG: medium-energy gratings (MEG's) covering the 0.4-5 keV band and high-energy gratings (HEG's) covering the 0.9-10 keV band. The MEG's are mounted behind the annular aperture of the outer two mirror pairs while the HEG's are mounted behind the apertures of the inner two mirror pairs. The two sets of gratings operate simultaneously; the dispersed axes of the spectra cross at a shallow angle in the focal plane. The ACIS-I is the readout of choice for use with the HETG. The resolving power ($E/\Delta E$) varies from ~800 at 1.5 keV to ~200 at 6 keV.

The Low-Energy Transmission Grating (LETG) is optimized for high-resolution spectroscopy over energy bandwidth ~0.09-4 keV. The LETG provides resolving power >1000 at 0.1 keV, ~200 at 1.5 keV. The HRC-S is the only detector aboard the Observatory that can accommodate the fully dispersed spectrum.

Detailed descriptions of all of the instruments are contained in the *Proposer's and Observatory Guide*. The reader should refer to that document for additional details.

A.3 Operation

The initial *Chandra* operational orbit was achieved by use of Boeing's Inertial Upper Stage and *Chandra*'s own propulsion system. The baseline mission lifetime is 5 years and there are sufficient expendables (control gas for maneuvers) for more than 10 years. The orbital lifetime is even longer. The initial apogee and perigee were 9850 km and 139,200 km, respectively with an orbital period of 64.3 hours. The orbital parameters change with time. On November 2, 1999, e.g. the apogee was 138,800 km, the perigee 10,100 km and the orbital period 63.5 hours. The orbit allows for reasonably long uninterrupted observations of up to ~ 170 ks before the instruments have to be "safed" for possible damage due to the radiation environment as the satellite dips into the radiation belts.

The observatory's solar panels can rotate about an axis perpendicular to the optical axis so that *Chandra* can be pointed to any position in the sky except for avoidance regions around the Sun (45 degrees), Moon (6 degrees) and Earth (20 degrees) at any time of the year, although there are certain roll constraints. Note that both the

Moon and Earth may be viewed as long as an accurate aspect solution is not required. The high elliptical orbit and the radiation belts that prevent the conduct of observations at low altitudes imply that the preponderance of observations are nearer apogee where the Earth, as seen from *Chandra*, appears to move only slowly through the sky. As a result, the Earth and its surrounding avoidance region constitute an portion of the sky that will be partially blocked from view throughout the NRA cycle. Long, continuous observations in this region (>30 ks at the center, but more at the edges) will be difficult, but shorter observations are possible. The proposer is urged to read the appropriate chapter of the *Proposer's and Observatory Guide* to become familiar with all of the observing constraints and to make use of the observation visualization tool (WebVis at (http://asc.harvard.edu/) to see how these constraints might impact their observations.

A.4 Proposal Policy Summary

The scientific proposals solicited by this NRA must be obtained through competitive proposals. These proposals will be evaluated by a peer review administered by NASA Headquarters.

The available observing time is divided into several categories. Calibration Observations are budgeted at 3 percent. Nonanticipated Targets of Opportunity (ToO) and Director's Discretionary Time are limited to 5 percent of the time. Observations cannot be performed during passage through the radiation belts, and maneuvers between targets. The remaining time is free for specific observations. During Cycle 2 this remaining time is allocated as 74 percent GO and GTO. For future cycles it will be allocated at 85 percent GO and 15 percent GTO.

Cycle 2 is the last observing cycle for which GTO's will be specified prior to the NRA. In future observing cycles, the GTO's will be required to propose for targets in competition with the GO's. However, all proposer's will need to be cognizant of all Cycle 1 observations, including calibrations, and all Cycle 2 observations and GTO observations. Appendix E guides the proposer in obtaining this information.

Proposals for archival research will also be considered. Proposers may assume the successful completion of Cycle 1 and that all proprietary data will be in the archive approximately one year after the observation. Proposers for archival research should be aware that funding will be initiated only after at least one of the relevant observations has been made public in the archive.

A.5 The *Chandra* X-ray Center

The *Chandra* X-ray Center (CXC) is responsible for planning and conducting *Chandra* observations. The CXC is responsible for generating the science time-line which includes user-imposed constraints as well as the instrument- or satellite-imposed constraints. All telemetry is sent to the Operations Control Center (OCC) in Cambridge, Massachusetts. The CXC Data Systems Group receives and processes the data, generates standard data products for validation and distribution to the principal investigator of a specific observation. The CXC also provides and supports data analysis software and a permanent archive of the *Chandra* data. GTO and GO data in the archive will be available to the public starting after the one-year proprietary period expires. Calibration data are available immediately. The User Support Group (USG) supports observers with their analysis of these data. The USG will also provide additional technical information, as needed, for the preparation of proposals.

INSTRUCTIONS FOR RESPONDING TO NASA RESEARCH ANNOUNCEMENTS

(September 1999 as revised per NASA Deviation dtd. January 5, 2000)

NASA Federal Acquisition Regulations (FAR) Supplement (NFS) Version 97.0
Part 1852.235-72 (accessible through URL
<http://www.hq.nasa.gov/office/procurement/regs/nfstoc.htm>)

(a) General.

(1) Proposals received in response to a NASA Research Announcement (NRA) will be used only for evaluation purposes. NASA does not allow a proposal, the contents of which are not available without restriction from another source, or any unique ideas submitted in response to an NRA to be used as the basis of a solicitation or in negotiation with other organizations, nor is a pre-award synopsis published for individual proposals.

(2) A solicited proposal that results in a NASA award becomes part of the record of that transaction and may be available to the public on specific request; however, information or material that NASA and the awardee mutually agree to be of a privileged nature will be held in confidence to the extent permitted by law, including the Freedom of Information Act.

(3) NRA's contain programmatic information and certain requirements which apply only to proposals prepared in response to that particular announcement. These instructions contain the general proposal preparation information which applies to responses to all NRA's.

(4) A contract, grant, cooperative agreement, or other agreement may be used to accomplish an effort funded in response to an NRA. NASA will determine the appropriate instrument. Contracts resulting from NRA's are subject to the Federal Acquisition Regulation and the NASA FAR Supplement. Any resultant grants or cooperative agreements will be awarded and administered in accordance with the NASA Grant and Cooperative Agreement Handbook (NPG 5800.1).

(5) NASA does not have mandatory forms or formats for responses to NRA's; however, it is requested that proposals conform to the guidelines in these instructions. NASA may accept proposals without discussion; hence, proposals should initially be as complete as possible and be submitted on the proposer's most favorable terms.

(6) To be considered for award, a submission must, at a minimum, present a specific project within the areas delineated by the NRA; contain sufficient technical and cost information to permit a meaningful evaluation; be signed by an official authorized to legally bind the submitting organization; not merely offer to perform standard services or to just provide computer facilities or services; and not significantly duplicate a more specific current or pending NASA solicitation.

(b) NRA-Specific Items. Several proposal submission items appear in the NRA itself: the unique NRA identifier; when to submit proposals; where to send proposals; number of copies required; and sources for more information. Items included in these instructions may be supplemented by the NRA.

(c) The following information is needed to permit consideration in an objective manner. NRA's will generally specify topics for which additional information or greater detail is desirable. Each proposal copy shall contain all submitted material, including a copy of the transmittal letter if it contains substantive information.

(1) Transmittal Letter or Prefatory Material.

(i) The legal name and address of the organization and specific division or campus identification if part of a larger organization;
(ii) A brief, scientifically valid project title intelligible to a scientifically literate reader and suitable for use in the public press;
(iii) Type of organization: e.g., profit, nonprofit, educational, small business, minority, women-owned, etc.;
(iv) Name and telephone number of the principal investigator and business personnel who may be contacted during evaluation or negotiation;
(v) Identification of other organizations that are currently evaluating a proposal for the same efforts;
(vi) Identification of the NRA, by number and title, to which the proposal is responding;
(vii) Dollar amount requested, desired starting date, and duration of project;
(viii) Date of submission; and
(ix) Signature of a responsible official or authorized representative of the organization, or any other person authorized to legally bind the organization (unless the signature appears on the proposal itself).

(2) Restriction on Use and Disclosure of Proposal Information. Information contained in proposals is used for evaluation purposes only. Offerors or quoters should, in order to maximize protection of trade secrets or other information that is confidential or privileged, place the following notice on the title page of the proposal and specify the information subject to the notice by inserting an appropriate identification in the notice. In any event, information contained in proposals will be protected to the extent permitted by law, but NASA assumes no liability for use and disclosure of information not made subject to the notice.

Notice

Restriction on Use and Disclosure of Proposal Information

> The information (data) contained in [insert page numbers or other identification] of this proposal constitutes a trade secret and/or information that is commercial or financial and confidential or privileged. It is furnished to the Government in confidence with the understanding that it will not, without permission of the offeror, be used or disclosed other than for evaluation purposes; provided, however, that in the event a contract (or other agreement) is awarded on the basis of this proposal the Government shall have the right to use and disclose this information (data) to the extent provided in the contract (or other agreement). This restriction does not limit the Government's right to use or disclose this information (data) if obtained from another source without restriction.

(3) Abstract. Include a concise (200-300 word if not otherwise specified in the NRA) abstract describing the objective and the method of approach.

(4) Project Description.

> (i) The main body of the proposal shall be a detailed statement of the work to be undertaken and should include objectives and expected significance; relation to the present state of knowledge; and relation to previous work done on the project and to related work in progress elsewhere. The statement should outline the plan of work, including the broad design of experiments to be undertaken and a description of experimental methods and procedures. The project description should address the evaluation factors in these instructions and any specific factors in the NRA. Any substantial collaboration with individuals not referred to in the budget or use of consultants should be described. Subcontracting significant portions of a research project is discouraged.

(ii) When it is expected that the effort will require more than one year, the proposal should cover the complete project to the extent that it can be reasonably anticipated. Principal emphasis should be on the first year of work, and the description should distinguish clearly between the first year's work and work planned for subsequent years.

(5) Management Approach. For large or complex efforts involving interactions among numerous individuals or other organizations, plans for distribution of responsibilities and arrangements for ensuring a coordinated effort should be described.

(6) Personnel. The principal investigator is responsible for supervision of the work and participates in the conduct of the research regardless of whether or not compensated under the award. A short biographical sketch of the principal investigator, a list of principal publications and any exceptional qualifications should be included. Omit social security number and other personal items which do not merit consideration in evaluation of the proposal. Give similar biographical information on other senior professional personnel who will be directly associated with the project. Give the names and titles of any other scientists and technical personnel associated substantially with the project in an advisory capacity. Universities should list the approximate number of students or other assistants, together with information as to their level of academic attainment. Any special industry-university cooperative arrangements should be described.

(7) Facilities and Equipment.

(i) Describe available facilities and major items of equipment especially adapted or suited to the proposed project, and any additional major equipment that will be required. Identify any Government-owned facilities, industrial plant equipment, or special tooling that are proposed for use. Include evidence of its availability and the cognizant Government points of contact.

(ii) Before requesting a major item of capital equipment, the proposer should determine if sharing or loan of equipment already within the organization is a feasible alternative. Where such arrangements cannot be made, the proposal should so state. The need for items that typically can be used for research and non-research purposes should be explained.

(8) Proposed Costs (U.S. Proposals Only).

(i) Proposals should contain cost and technical parts in one volume: do not use separate "confidential" salary pages. As applicable, include separate cost estimates for salaries and wages; fringe benefits; equipment; expendable materials and supplies; services; domestic and foreign travel; ADP expenses; publication or page charges; consultants; subcontracts; other miscellaneous identifiable direct costs; and indirect costs. List salaries and wages in appropriate organizational categories (e.g., principal investigator, other scientific and engineering professionals, graduate students, research assistants, and technicians and other non-professional personnel). Estimate all staffing data in terms of staff-months or fractions of full-time.
(ii) Explanatory notes should accompany the cost proposal to provide identification and estimated cost of major capital equipment items to be acquired; purpose and estimated number and lengths of trips planned; basis for indirect cost computation (including date of most recent negotiation and cognizant agency); and clarification of other items in the cost proposal that are not self-evident. List estimated expenses as yearly requirements by major work phases.
(iii) Allowable costs are governed by FAR Part 31 and the NASA FAR Supplement Part 1831 (and OMB Circulars A-21 for educational institutions and A-122 for nonprofit organizations).
(iv) Use of NASA funds--NASA funding may not be used for foreign research efforts at any level, whether as a collaborator or a subcontract. The direct purchase of supplies and/or services, which do not constitute research, from non-U.S. sources by U.S. award recipients is permitted. Additionally, in accordance with the National Space Transportation Policy, use of a non-U.S. manufactured launch vehicle is permitted only on a no-exchange-of-funds basis.

(9) Security. Proposals should not contain security classified material. If the research requires access to or may generate security classified information, the submitter will be required to comply with Government security regulations.

(10) Current Support. For other current projects being conducted by the principal investigator, provide title of project, sponsoring agency, and ending date.

(11) Special Matters.

(i) Include any required statements of environmental impact of the research, human subject or animal care provisions, conflict of interest, or on such other topics as may be required by the nature of the effort and current statutes, executive orders, or other current Government-wide guidelines.
(ii) Proposers should include a brief description of the organization, its facilities, and previous work experience in the field of the proposal. Identify the cognizant Government audit agency, inspection agency, and administrative contracting officer, when applicable.

(d) Renewal Proposals.

(1) Renewal proposals for existing awards will be considered in the same manner as proposals for new endeavors. A renewal proposal should not repeat all of the information that was in the original proposal. The renewal proposal should refer to its predecessor, update the parts that are no longer current, and indicate what elements of the research are expected to be covered during the period for which support is desired. A description of any significant findings since the most recent progress report should be included. The renewal proposal should treat, in reasonable detail, the plans for the next period, contain a cost estimate, and otherwise adhere to these instructions.

(2) NASA may renew an effort either through amendment of an existing contract or by a new award.

(e) Length. Unless otherwise specified in the NRA, effort should be made to keep proposals as brief as possible, concentrating on substantive material. Few proposals need exceed 15-20 pages. Necessary detailed information, such as reprints, should be included as attachments. A complete set of attachments is necessary for each copy of the proposal. As proposals are not returned, avoid use of "one-of-a-kind" attachments.

(f) Joint Proposals.

(1) Where multiple organizations are involved, the proposal may be submitted by only one of them. It should clearly describe the role to be played by the other organizations and indicate the legal and managerial arrangements contemplated. In other instances, simultaneous submission of related proposals from each organization might be appropriate, in which case parallel awards would be made.

(2) Where a project of a cooperative nature with NASA is contemplated, describe the contributions expected from any participating NASA investigator and agency facilities or equipment which may be required. The proposal must be confined only to that which the proposing organization can commit itself. "Joint" proposals which specify the internal arrangements NASA will actually make are not acceptable as a means of establishing an agency commitment.

(g) Late Proposals. Proposals or proposal modifications received after the latest date specified for receipt may be considered if a significant reduction in cost to the Government is probable or if there are significant technical advantages, as compared with proposals previously received.

(h) Withdrawal. Proposals may be withdrawn by the proposer at any time before award. Offerors are requested to notify NASA if the proposal is funded by another organization or of other changed circumstances which dictate termination of evaluation.

(i) Evaluation Factors.

(1) Unless otherwise specified in the NRA, the principal elements (of approximately equal weight) considered in evaluating a proposal are its relevance to NASA's objectives, intrinsic merit, and cost.

(2) Evaluation of a proposal's relevance to NASA's objectives includes the consideration of the potential contribution of the effort to NASA's mission.

(3) Evaluation of its intrinsic merit includes the consideration of the following factors of equal importance:

(i) Overall scientific or technical merit of the proposal or unique and innovative methods, approaches, or concepts demonstrated by the proposal.
(ii) Offeror's capabilities, related experience, facilities, techniques, or unique combinations of these which are integral factors for achieving the proposal objectives.
(iii) The qualifications, capabilities, and experience of the proposed principal investigator, team leader, or key personnel critical in achieving the proposal objectives.
(iv) Overall standing among similar proposals and/or evaluation against the state-of-the-art.

(4) Evaluation of the cost of a proposed effort may include the realism and reasonableness of the proposed cost and available funds.

(j) Evaluation Techniques. Selection decisions will be made following peer and/or scientific review of the proposals. Several evaluation techniques are regularly used within NASA. In all cases proposals are subject to scientific review by discipline specialists in the area of the proposal. Some proposals are reviewed entirely in-house, others are evaluated by a combination of in-house and selected external reviewers, while yet others are subject to the full external peer review technique (with due regard for conflict-of-interest and protection of proposal information), such as by mail or through assembled panels. The final decisions are made by a NASA selecting official. A proposal which is scientifically and programmatically meritorious, but not selected for award during its initial review, may be included in subsequent reviews unless the proposer requests otherwise.

(k) Selection for Award.

(1) When a proposal is not selected for award, the proposer will be notified. NASA will explain generally why the proposal was not selected. Proposers desiring additional information may contact the selecting official who will arrange a debriefing.

(2) When a proposal is selected for award, negotiation and award will be handled by the procurement office in the funding installation. The proposal is used as the basis for negotiation. The contracting officer may request certain business data and may forward a model award instrument and other information pertinent to negotiation.

(l) Additional Guidelines Applicable to Foreign Proposals and Proposals Including Foreign Participation.

(1) NASA welcomes proposals from outside the U.S. However, foreign entities are generally not eligible for funding from NASA. Therefore, unless otherwise noted in the NRA, proposals from foreign entities should not include a cost plan unless the proposal involves collaboration with a U.S. institution, in which case a cost plan for only the participation of the U.S. entity must be included. Proposals from foreign entities and proposals from U.S. entities that include foreign participation must be endorsed by the respective government agency or funding/sponsoring institution in the country from which the foreign entity is proposing. Such endorsement should indicate that the proposal merits careful consideration by NASA, and if the proposal is selected, sufficient funds will be made available to undertake the activity as proposed.

(2) All foreign proposals must be typewritten in English and comply with all other submission requirements stated in the NRA. All foreign proposals will undergo the same evaluation and selection process as those originating in the U.S. All proposals must be received before the established closing date. Those received after the closing date will be treated in accordance with paragraph (g) of this provision. Sponsoring foreign government agencies or funding institutions may, in exceptional situations, forward a proposal without endorsement if endorsement is not possible before the announced closing date. In such cases, the NASA sponsoring office should be advised when a decision on endorsement can be expected.

(3) Successful and unsuccessful foreign entities will be contacted directly by the NASA sponsoring office. Copies of these letters will be sent to the foreign sponsor. Should a foreign proposal or a U.S. proposal with foreign participation be selected, NASA's Office of External Relations will arrange with the foreign sponsor for the proposed participation on a no-exchange-of-funds basis, in which NASA and the non-U.S. sponsoring agency or funding institution will each bear the cost of discharging their respective responsibilities.

(4) Depending on the nature and extent of the proposed cooperation, these arrangements may entail:

(i) An exchange of letters between NASA and the foreign sponsor; or
(ii) A formal Agency-to-Agency Memorandum of Understanding (MOU).

(m) Export Control Guidelines Applicable to Foreign Proposals and Proposals Including Foreign Participation. Foreign proposals and proposals including foreign participation must include a section discussing compliance with U.S. export laws and regulations, e.g. 22 CFR Parts 120-130 and 15 CFR Parts 730-774, as applicable to the circumstances surrounding the particular foreign participation. The discussion must describe in detail the proposed foreign participation and is to include, but not be limited to, whether or not the foreign participation may require the prospective proposer to obtain the prior approval of the Department of State or the Department of Commerce via a technical assistance agreement or an export license, or whether a license exemption/exception may apply. If prior approvals via licenses are necessary, discuss whether the license has been applied for or if not, the projected timing of the application and any implications for the schedule. Information regarding U.S. export regulations is available at http://www.pmdtc.org and http://www.bxa.doc.gov. Proposers are advised that under U.S. law and regulations, spacecraft and their specifically designed, modified, or configured systems, components and parts are generally considered “Defense Articles” on the United States Munitions List and subject to the provisions of the International Traffic in Arms Regulations (ITAR), 22 CFR Parts 120-130.

(n) Cancellation of NRA. NASA reserves the right to make no awards under this NRA and to cancel this NRA. NASA assumes no liability for canceling the NRA or for anyone's failure to receive actual notice of cancellation.

Additional Information Regarding Proposal Submission, Evaluation, Selection, and Implementation

The information contained in Appendix C augments and supersedes Appendix B and applies only to this NRA.

C.1 Proposal Preparation and Submission

C.1.1 General Observing Parameters for New Observations

The new GO observations to be carried out with *Chandra* during the 12 months of Cycle 2 science operations will be selected from proposals submitted to NASA in response to this NRA. Once the targets to be observed are identified, the *Chandra* X-ray Center (CXC) is responsible for generating the science timeline. The timeline is determined for the most part by the observing constraints which typically include Sun, Moon, and Earth avoidance. Roll constraints also apply. The anti-Sun direction has an avoidance angle of ~35° because of engineering concerns for solar radiation impinging on the thermal radiators of ACIS and because of the inability of the Sun sensors to place the observatory into safe mode in the event of a problem. Proposers may also specify additional constraints such as a particular time or time interval during which an observation must take place. Proposers should note that the time-constrained observations are difficult to accomplish efficiently and are thus limited to no more than 20 percent of the total number of observations selected.

There are no restrictions regarding the amount of observing time or the number of targets that may be requested. Proposals may be submitted for single targets with a relatively short observation time, or for larger programs involving multiple targets or significant amounts of observing time. All proposals will be reviewed and a mix of large and small programs will be selected. For this observing cycle at least 20% of the GO time will be allocated for Large Projects (defined as those requesting >300 ksec of observing time). Observing proposals will not be accepted for observations distributed over multiple proposal cycles.

Proposals are solicited for preplanned Targets of Opportunity. These are observations which depend on certain astronomical events such as a supernova or a gamma-ray burst. The Observatory response time is ~24 hours, and this constraint needs to be taken into account. Once a TOO has been selected as a result of the peer review process, the observing time is awarded but not scheduled until the triggering event takes place. It will be the responsibility of the investigator to alert the CXC of the occurrence of such an event. Proposals for preplanned TOO's must not contain a mixture of TOO and non-TOO targets.

Those proposing for a TOO should be cognizant that GTO time cannot be used for such observations, and that any such observations awarded for Cycle 1, but not accomplished cannot be carried over. They can, however, be proposed for Cycle 2. Since the NRA is being announced prior to the end of Cycle 1, there may be a set of preplanned Cycle 1 TOO's that have not been triggered/accomplished. Proposers may choose to assume that these will not be accomplished.

C.1.2 Who May Propose

Proposals may be submitted from any institution within or outside the USA. *Chandra* proposals must identify a single Principal Investigator (PI) who assumes full responsibility for the conduct of the scientific investigation.

Following selection and notification by NASA, the CXC will communicate formally only with the PI. In the event that the PI is unavailable, the CXC will communicate with the person identified in the proposal as the Observing Investigator. It will be the PI's responsibility to respond to any questions concerning observational constraints or configurations.

C.1.3 Foreign Participation

NASA welcomes proposals from outside the United States. Submission details may be found in Section (l) of Appendix B.

C.2 Proposal Format and Content

C.2.1 Overview

The proposal review procedure will be conducted in two stages to minimize the burden of proposal preparation. During the first part, the scientific and technical merits of the proposed investigation will be reviewed, including the appropriateness of using *Chandra* to address the scientific objectives and its relevance to furthering our understanding of high energy astrophysical processes. Based upon the results of this Stage 1 review (scientific and technical review), the *Chandra* Program Scientist at NASA Headquarters will recommend a set of proposals to be considered for award of observing time (proposals for new observations) or award of support (archive proposals) during Cycle 2. The PI's of these proposals will then be asked to submit a cost proposal for the Stage 2 review (Cost Review) and will also be given an opportunity to submit an E/PO proposal. A subset of the Stage 1 panel will then evaluate the cost proposals. A separate panel will also be convened to review the E/PO proposals. Based upon overall consideration of scientific and cost factors, and the results of the review of the associated E/PO proposals, the *Chandra* Program Scientist will recommend a set of proposals for consideration by the Selecting Official for final selection and award. The Stage 2 reviews will take place approximately 6-8 weeks after the end of the Stage 1 review. Following the second reviews, those proposers selected for award will be notified of the recommended funding level for their investigation and the grant awards will be issued and administered by the Smithsonian Astrophysical Observatory for and on behalf of NASA.

C.2.2 Stage 1 Proposal Details

Proposal Content. The Stage 1 proposal must include a standard Cover Page, a General Form, the scientific and technical justification (as described below), a Target Summary Form (which includes either 2 ACIS pages or an HRC parameter page depending upon the detector requested), and, optionally, a Target Constraints Form and a Target Remarks form. The forms must be submitted electronically (see Appendix D for electronic proposal submission instructions). The information in the forms will be entered into a data base that will be used in cataloging and evaluating proposals, as well as scheduling observations that are selected for implementation. The forms must be completed in the requested format. Cost sections and E/PO proposals need not be submitted for the Stage 1 scientific review. Cost and E/PO proposals will be considered as part of the Stage 2 process.

Although a signature block is included on the General Form, institutional endorsements are optional for the Stage 1 science and technical proposal. A signature block is included in case signatures are required by the proposing institution. Institutional endorsements are required for a Stage 2 cost proposal.

The abstract on the Cover Page is limited to 800 characters, including spaces between words. If the abstract exceeds this length, it will be truncated automatically at 800 characters when entered into the data base. The list of selected targets and corresponding abstracts will be made public.

The proposer is urged to be as accurate as possible when stating the desired pointing position of the Observatory, as even small errors can seriously impact the quality of the data. Positions must be given in equinox/epoch J2000.

Proposers requesting more than one target, or multiple pointings at a single target, should assign a Target Number that indicates the investigation's order of priority. Prioritization will aid the Selecting Official in the event that a reduction in observing time is necessary. In such cases, every attempt will be made to honor the highest priority requests.

The discussion of the scientific investigation should provide the following information:

(1) Scientific Problem. State clearly the scientific problem, with relevant background and references to previous work. Show how the proposed investigation may be used to advance our knowledge and understanding. Justify the use of CXO to accomplish your objectives, in contrast to using other available observatories. Any constraint on the observations must be clearly stated and justified. Discuss the data analysis program required to attain the science goals including the scope of the effort. Proposals that request funding for archival research must include a discussion of any material that resulted from these observations and an indication as to how and why the proposed reasearch extends these results.

(2) Technical Feasibility. Show how the particular details (observing time, instrument details, etc.) of your proposed observation allow one to achieve the stated scientific objectives. State how targets or pointing locations were selected. List assumptions about source intensity, surface brightness, and spectrum. Estimates of both count rates and total counts needed for the investigation must be provided. It is in the proposer's best interest to allow a reviewer to understand their assumptions and to be able to easily reproduce the estimates of the counting rate(s). The proposer should also demonstrate that the estimated counts are sufficient to extract the desired science results from the observation. Proposal preparation and simulation tools are available on the World Wide Web at <http://asc.harvard.edu>. The proposer is urged to make use of these tools and to use them well before the deadline for proposal submission. The impacts of pulse pileup on the observed energy spectrum should be addressed for observations with ACIS or HETG/ACIS of even moderately bright sources. Proposals that might encounter this situation must explicitly discuss how it is planned to deal with pulse pileup data and to demonstrate a thorough understanding of the implications for their proposed research. Proposers wishing to apply for the *Chandra*-HST and/or NOAO opportunities discussed on the next page need also address the technical feasibility of those observations in their proposals.

Proposers interested in researching the archives should also discuss how the archival data are sufficient to meet their objective(s). Furthermore, such proposals must address the analysis tools, their suitability for accomplishing the investigation, and the proposer's ability to apply properly such tools to the project.

(3) Constrained Observations. The proposer may desire to place constraints (monitoring, coordinated with observations at other wavelengths, uninterrupted, roll angle, etc.) on the proposed observations. Constraints limit the flexibility of scheduling and, therefore, reduce the overall observing efficiency. Proposers should consider carefully the impact of a request for a constrained observation and provide scientific justification. Proposers should also note the potential impact on time-constrained observations of potential interruption by a TOO. An observation with tight time or roll constraints, if bumped or otherwise unscheduled, may be delayed 6 months or a year. No more than 20% of *Chandra* observing time will be allocated to constrained observations.

A one page biography/bibliography of the principal investigator may be included.

Large Projects. Large Projects are those that require more than 300 ksec observing time, whether long-duration observations of single targets or shorter duration observations of many targets. Large Projects are encouraged: at least 20 % of the GO observing time awarded during Cycle 2 and beyond will be allocated for Large Projects, subject to reasonable standards of scientific merit, as determined through peer review. At least 2800 ksec of observing time is thus expected to be allocated to GO Large Projects in Cycle 2.

The observations proposed for large projects must also be completed within the time covered by this NRA. Proposals that require a large number of targets should, whenever possible, indicate in their prioritization alternate targets to help avoid conflicts with smaller proposals of high scientific

merit. In the case of conflicting proposals for a specific target, the selecting official, based on a peer review recommendation, may award the target in question to the smaller proposal and chose an alternate target from the large project's list. In this case, the large project proposer may make use of the data once it is made public.

Coordinated *Chandra-Hubble* Proposals. NASA has introduced a program to allow observers interested in using both the HST and the CXO to achieve their scientific objectives to submit a single Stage 1 proposal in response to either HST or *Chandra* Research Announcements. Thus, proposers responding to this NRA may request, and be awarded, HST observing time in conjunction with their *Chandra* observations. 100 orbits of HST observation time are available for this opportunity. We note that about 400 ks of *Chandra* Observing time were similarly awarded as part of the response to HST Cycle 9 proposals.

Proposers wishing to take advantage of the CXO-HST arrangements are encouraged to submit their proposal to the Observatory which best supports their scientific objectives. Clearly the expertise to best appreciate and evaluate the proposals will be weighted toward the wavelength band of the Observatory of interest. Demonstrating technical feasibility for both Observatories is required and the *Hubble* Space Telescope Science Institute is prepared to assist observers in response to this opportunity. Information concerning HST may be found at http://www.stsci.edu/.

Coordinated Chandra-NOAO Proposals (National Radio Astronomy Observatory). Proposers interested in making use of NOAO facilities (except Gemini) may submit a single proposal in response to this NRA. However, this opportunity is restricted to Large Projects as described above, and is not intended for ground-based follow-up of X-ray selected sources. Such projects should be proposed directly to the NOAO. The emphasis here is to address those situations where the creation of a multiwavelength database is required to meet the scientific objectives of the proposal. The highest priority for the award of NOAO time will be given to programs that create databases likely to have broad application. NOAO plans to make up to 5 percent (20 nights at each of the available facilities, with the exception of Gemini) available for this opportunity. NOAO observing time will be spread equally among the semesters from Fall 2000 through the Spring semester 2002.

The award of observing time using NOAO facilities is contingent upon making the ground based data available in a publicly-accessible archive at the same time that the Chandra data become public.

Proposers wishing to make use of this opportunity must provide the following:

1) the choice of NOAO telescope(s) and instrument(s);

2) the estimated observing time for each;

3) a full and comprehensive scientific and technical justification for the requested observing time;

4) a credible plan for reducing, documenting the quality of, and populating a publicly-accessible archive with, the data; and,

5) specification of the number of nights for each semester during which time will be required.

Details concerning NOAO facilities may be found on the WWW at http://www.noao.edu/.

Page Restrictions. Because of the large number of proposals anticipated in response to this NRA, there will be strict page limits as shown in Table 1. Specifically, the section on scientific justification and technical feasibility is limited to 6 pages for observing proposals that are classified as large projects (> 300 ks) and 4 pages in all other cases including proposals for archival research.

Reviewers will consider only those pages in each proposal section that do not exceed the page limits specified in Table 1. Each side of a paper sheet containing text or illustration counts as one page. All text should be typewritten in English, either single or double-spaced, using an easily read font having no more than 15 characters per inch. Text is limited to not more than 55 lines per page. Margins should be a minimum of 1 inch on all sides.

Table 1: Proposed Content and Page Limit

Section	Page Limit	Comments
Cover Page	1	No other cover needed.
General	1	
Scientific Problem and Technical Feasibility	4 6	Includes text, figures, charts tables and references. Large Projects only (> 300 ksec)
Target Summary Form, including ACIS Parameter or HRC Parameter Pages.		
Target Constraints Form	1 or more (optional)	As needed.
Target Remarks Form	1 each (optional)	As needed.
Biography/bibliography of PI	1	Optional.

Technical Information. Technical questions concerning the *Chandra* mission and requests for assistance in proposal submission may be addressed to the *Chandra* User Support Group via the Help Desk at:

http://asc.harvard.edu/

or

Chandra User Support
Chandra X-ray Center
Mail Stop 4
Smithsonian Astrophysical Observatory
60 Garden Street
Cambridge, MA 02138-1516
Telephone: (617) 495-7282; FAX: (617) 495-7356
E-mail (Internet): usupport@cfa.harvard.edu

Electronic Proposal Submission. All proposals are required to be submitted electronically according to the instructions given in Appendix D. Electronic submission facilitates efficient proposal processing and reduces the likelihood of transcription error into the various databases. Proposers who do not have access to electronic communications should contact the Chandra User Support Group (USG) at usupport@cfa.harvard.edu. . Questions may also be submitted via the "Help Desk" interface on the USG home page reachable through the *Chandra* Web Site at http://asc.harvard.edu.

C.2.3 Stage 2 Cost Proposal Details

A cost proposal will be requested for all investigations that receive sufficiently high evaluations during the Stage 1 review and that require financial support via NASA. Education/Public Outreach proposals will also be solicited at this time. Appendix F gives details on the requirements for an E/PO proposal. Note that changes to the science proposal will not be considered for the Stage 2 submission.

Cost proposals will be due approximately 6-8 weeks after the Stage 1 review. A cost proposal consists of:

- The Cover Page form and General Form, printed out from the Web site, with institutional signatures. Institutional endorsement is required for a Stage 2 cost proposal. The box indicating whether an E/PO proposal has been submitted should be checked as appropriate. The total budget for the (optional) E/PO proposal budget should also appear where indicated on the cover page.

- A one page (or less) summary of the budget justification. The budget justification summary should include a breakdown of the work assignments for all funded investigators taking part in the investigation, justification of any major purchases including workstations, justification of foreign or excessive travel, and any cost sharing applied to this project. Funding will be provided within a single year; multiyear programs are not allowed.

- A budget using the enclosed Budget Summary form (page C-16). In addition, a budget may be included that is prepared according to the guidelines of the proposing institution and that includes the cost information listed below. Include a detailed budget for each funded Co-I. The PI's Budget Summary form must include the totals of the Co-I's budgets as line items.

- A list of current or currently proposed research support from all sources for the PI and any funded Co-I's. For current support (in any period that will overlap with this award) and pending support (include continuations of multiple year awards), include the name of the investigator, project title, sponsoring agency, period of performance and amount of award, and commitment by investigator in terms of full-time equivalent (FTE) work year.

- Any required Certifications. U.S. Code currently requires that a signed copy of each of the following three certifications (found at the end of this Appendix) must be submitted with the original signed copy of a Stage 2 proposal from any type of organization except for those of the U.S. Government: (a) Certification regarding Debarment, Suspension, and Other Responsibility Matters; (b) Certification regarding Nondiscrimination; and (c) Certification regarding Lobbying (required only for proposals requesting a cumulative total of $100,000 or more).

As part of the proposal and corresponding budget for a *Chandra* investigation, proposers may request support for correlative observations at other wavelengths. Funding for such correlative studies will be considered only insofar as they directly support a specific investigation using *Chandra*.

The Budget Summary should contain estimated costs for the following potential expenditures:

- Cost estimates for direct labor, including individual person-months, salaries, wages, and fringe benefits for the personnel involved.

- Travel costs -- itemize trips, including travel to data analysis centers.

- Estimated costs for workstations, other equipment, supplies, and computer services. Itemize items over $500. See below for additional information on workstation requests.

- Publication costs.

- Subgrants or subcontracts - itemize expenditures at a level similar to the parent grant.

- Overhead or indirect rates and costs.

- Other costs, with explanation, including any Education/Public Outreach costs.

- Contributions from any cost-sharing plan.

- Total cost of support being requested via NASA.

Any resultant grant will be awarded and administered in accordance with terms and conditions for CXC Observing Program Awards (http://asc.harvard.edu).

To assure compatibility with NASA's data systems, requested workstation systems must be capable of supporting existing portable data analysis environments on a range of platforms and operating systems including Unix and Linux. In addition, requested computer systems should have at least 64 MB of RAM and a 4 GB or larger hard drive (for further technical specifications, contact the CXC). Portable analysis software, the *Chandra* Interactive and Analysis of Observations (CIAO), will be available for the following UNIX platforms.

Sun Solaris 2.6
PC/Linux Redhat 5.2
PC/Linux Slackware 3.

Requests for workstations must be justified in the text of both the science and the technical portions of the proposal and in the budget explanation. Such justification should briefly describe the computing capabilities that exist or are expected to exist at the proposer's institution during the period in which the proposed research would be performed and then explain the scientific impact to the proposed work if the request for the additional workstation is declined. The budget request for workstations must be clearly stated in the Budget Summary form as a line item.

C.3 Proposal Evaluation, Selection, and Implementation

The evaluation criteria listed in C.3.1 and C.3.2 supercede the criteria given in Appendix B.

C.3.1 Stage 1 Proposals

Evaluation Criteria. The criteria used in the Stage 1 evaluation are listed below.

- The overall scientific merit of the investigation and its relevance to NASA’s space science program.

- The suitability of using the *Chandra* observatory and data products for the proposed investigation, the feasibility of accomplishing the objectives of the investigation within the time, telemetry, and scheduling constraints, and the feasibility of the analysis techniques. For programs incurring a large expenditure of observatory time relative to exposure time (e.g., multiple short exposure or raster scans), the total observatory time required will be considered.

- The competence and relevant experience of the principal investigator and any collaborators as an indication of their ability to carry the investigation to a successful conclusion. Past performance in scientific research, as evidenced by the timely publication of refereed scientific papers, will be considered.

The first of these criteria is weighted slightly more than the second and three times that of the third.

Stage 1 Determination. Experience with previous solicitations indicates a substantial oversubscription of *Chandra* observing time is likely. All proposals evaluated in response to this NRA will first be reviewed for technical feasibility by *Chandra* X-ray Center staff. This consists of an evaluation of technical feasibility within spacecraft constraints, instrument capability, and observational constraints, a determination of target coincidence with reserved calibration or GTO targets, and an estimation of required spacecraft resources including total time to complete all proposed observations.

Chandra observation proposals will be evaluated for scientific and technical merit by a scientific peer review convened by NASA, and a numerical grade will be assigned to each proposal. The peer review panel will judge whether a proposed observational program essentially duplicates one or more observations already obtained or scheduled from Cycle 1, or reserved by GTO's to be observed during Cycle 2. Appendix E gives instructions for obtaining information on completed and planned observations.

The review will be conducted by subpanels, each responsible for proposals directed at particular science topics. A Merging Panel will consider the selections of individual science panels and will make the final time allocation. Large Projects will be evaluated by the science panels but the final award of time will be made by the Merging Panel.

To aid in the Stage 2 cost review, the data analysis and interpretation effort required to complete the proposed science goals will be evaluated by the Stage 1 peer review panel.

C.3.2 Stage 2 Proposal Evaluation and Selection

Based on the Stage 1 rating, NASA will recommend whether or not a Stage 2 proposal should be submitted. NASA intends to recommend that only a limited number of highly rated investigations proceed to Stage 2. Proposers not recommended to proceed to Stage 2 are not prohibited from preparing a Stage 2 proposal, but should be aware that their proposed investigation is unlikely to be selected. Education and Public Outreach (E/PO) proposals will also be solicited at this time. Stage 2 and E/PO proposals will be due approximately 6-8 weeks after Stage 1 selection. A review team comprised of a subset of the Stage 1 peer review panel will then review the cost proposals for overall consideration of both scientific and cost factors. (The E/PO proposal will receive an independent review as described in Appendix F). In addition to the overall scientific/technical rating of the proposed investigation, input to the Stage 2 review will include an evaluation of the level of effort required to complete the data analysis and interpretation phase of the project. Based on these evaluations, the *Chandra* Program Scientist will recommend a set of proposals to the Selecting Official for final selection and award.

Evaluation Criterion. The criterion used in the Stage 2 evaluation of the scientific proposal will be:

The total cost of the investigation, including cost realism and reasonableness, in the context of the anticipated level of effort required to carry out the investigation successfully, and the total proposed cost in relation to available funds.

A total of about $10 million is planned for the support of GO's for proposals solicited in this NRA, including the support of the E/PO elements of investigations. It is anticipated that approximately 250 investigations will be recommended for selection. NASA reserves the right to adjust costs of the proposal to fit the program within the budget constraints.

Selection. After evaluation of Stage 2 proposals (including E/PO), selection will be made based on the Stage 1 evaluation of scientific merit and technical feasibility, and the Stage 2 evaluation of proposed costs.

Evaluation of any proposed Education/Public Outreach activity will be used to discriminate among otherwise equally rated proposals.

Successful proposers will be notified concerning the selection of their proposal and the level of funding approved for their investigation shortly following selection.

C.4 Implementation

All approved targets will be placed into an observation database in which each observation is assigned a unique identifying number. It is the responsibility of the *Chandra* Mission Planning and Operations teams at the CXC to produce a mission timeline from all approved observation requests. The process of mission timeline generation is split into two parts.

First, for the entire period covered by this NRA, a long-term mission timeline (LMTL) will be generated with a precision of about a week. Additional LMTL's will be generated as needed in response to TOO's and other timeline changes. Targets are scheduled in the LMTL to achieve maximum efficiency in the observing program within the operational constraints of *Chandra*. Unconstrained observations will be scheduled to produce the highest observing efficiency. A small percentage of the targets will not be assigned to a specific LTML slot, but will be held in a pool for use in short term scheduling with high viewing efficiency.

Second, about four weeks prior to the anticipated execution of the observations, a short-term mission timeline (SMTL) will be produced on the basis of the LMTL. The SMTL is used for the automatic generation of the required spacecraft commands. The SMTL, including slew times, pointing direction, guide stars, roll angles, etc., will be well-defined approximately two weeks in advance of execution.

The *Chandra* X-ray Center will make its best effort to schedule all approved observations. All approved non-TOO observations that are not scheduled, or that were scheduled but not successfully executed for whatever reason, will automatically be rescheduled within the current NRA period or carried over into the observing program of the next observing cycle. However, approved TOO observations which are not triggered will not be carried into the next NRA period, but must be re-proposed.

If observations are cut short by mission timeline optimization or other constraints, the completeness criterion will determine whether a given target is scheduled for additional observing time. The completion criterion for each requested pointing with *Chandra* is 80% of the approved exposure time.

Investigators whose proposals are selected will have proprietary use of their data for 12 months after receipt of the data in usable form, after which time the data will be placed in a public archive and thus be available to other interested investigators. The proprietary period for GTO observations is identical. A PI may waive or shorten the proprietary period as is customary for observations intended to benefit the general community.

C.5 Schedule

The current schedule for the review and selection of proposals for the second observing cycle on *Chandra* is listed in Table 2. Note that the dates of events planned beyond the Stage 1 Science Proposals Due Date are estimates and are subject to change.

Table 2: NRA Schedule

Date	Action
April 7, 2000	Release NRA
June 1, 2000	Science Proposals Due
August 2-4, 2000	Stage 1 Review
August 18, 2000	Announcement of Stage 1 Selections
September 15, 2000	Stage 2 Cost and E/PO Proposals Due
October 13, 2000	Stage 2 Cost and E/PO Review
November 2000	Final Selection of Proposals
November 2000	Begin Cycle 2 Observations (74% GO)

C6. Education and Public Outreach

Education and the enhancement of public understanding of space science are considered to be vital and integral parts of all NASA space science missions and research programs. Therefore, NASA OSS strongly encourages every proposer to any of its programs to include an Education/Public Outreach (E/PO) component with their research proposal in response to the guidelines outlined in Appendix F of this NRA. Scientific excellence and programmatic relevance of proposed

investigations will be the primary selection criteria, but the quality of a proposed E/PO effort will be used to discriminate between proposals of comparable merits. Therefore, prospective proposers will enhance the likelihood of selection by adding a viable E/PO activity to their research proposal. Note that E/PO tasks need not be original; the important factor is that a tenable task of merit be proposed that, if selected, will be carried out.

The OSS Education and Public Outreach program is described in Appendix F of this NRA, which also provides a discussion of the resources available to aid the space science community to become effectively involved in education and/or public outreach. Further information may also be accessed by selecting ``Education and Outreach" from the OSS homepage at http://spacescience.nasa.gov.

C7. Forms and Certifications

The following forms contain:

(i) the *Budget Summary* format; and

(ii) copies of the three *Certification* currently required by U.S. Code (Note: these individual *Certifications* are included for reference and should not be signed and returned; language is now included on the *Cover Page* that confirms that these certifications requirements are met once the printed copy of the *Cover page* is signed by the Authorizing Institutional Representative and submitted with the proposal).

Certification Regarding Debarment, Suspension, and Other Responsibility Matters

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 34 CFR Part 85, Section 85.510, Participant's responsibilities. The regulations were published as Part VII of the May 26, 1988 Federal Register (pages 19160-19211).

2. The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:
3. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
4. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statues or commission of embezzlement theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
5. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and
6. Have not within three-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

(2) Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Certification Regarding Lobbying

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000, and not more than $100,000 for each such failure.

Certification of Compliance with the NASA Regulations Pursuant to Nondiscrimination in Federally Assisted Programs

The *(Institution, corporation, firm, or other organization on whose behalf this assurance is signed, hereinafter called "Applicant ")* hereby agrees that it will comply with Title VI of the Civil Rights Act of 1964 (P.L. 88-352), Title IX of the Education Amendments of 1962 (20 U.S.C. 1680 et seq.), Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and the Age Discrimination Act of 1975 (42 U.S.C. 16101 et seq.), and all requirements imposed by or pursuant to the Regulation of the National Aeronautics and Space Administration (14 CFR Part 1250) (hereinafter called "NASA") issued pursuant to these laws, to the end that in accordance with these laws and regulations, no person in the United States shall, on the basis of race, color, national origin, sex, handicapped condition, or age be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity for which the Applicant receives federal financial assistance from NASA; and hereby give assurance that it will immediately take any measure necessary to effectuate this agreement.

If any real property or structure thereon is provided or improved with the aid of federal financial assistance extended to the Applicant by NASA, this assurance shall obligate the Applicant, or in the case of any transfer of such property, any transferee, for the period during which the real property or structure is used for a purpose for which the federal financial assistance is extended or for another purpose involving the provision of similar services or benefits. If any personal property is so provided, this assurance shall obligate the Applicant for the period during which the federal financial assistance is extended to it by NASA.

This assurance is given in consideration of and for the purpose of obtaining any and all federal grants, loans, contracts, property, discounts, or other federal financial assistance extended after the date hereof to the Applicant by NASA, including installment payments after such date on account of applications for federal financial assistance which were approved before such date. The Applicant recognized and agrees that such federal financial assistance will be extended in reliance on the representations and agreements made in this assurance, and that the United States shall have the right to seek judicial enforcement of this assurance. This assurance is binding on the Applicant, its successors, transferees, and assignees, and the person or persons whose signatures appear below are authorized to sign on behalf of the Applicant.

NASA FORM 1206

Instructions for Submitting *Chandra* Proposal Forms

Stage 1 proposals must be submitted electronically. There are two methods of accomplishing this, both of which make use of the Remote Proposal Submission (RPS) Software developed by NASA/GSFC. The proposer may access this system either through e-mail or the world wide web (www).

The www version of the Chandra RPS provides a form-based interface. Access is linked to the Chandra home page at <http://asc.harvard.edu>. Help files for each form and each input parameter are available as hypertext links, and the user has complete control over the entries.

The interface to the E-mail version of the Chandra RPS needs to be initiated by the proposer by accessing the web site listed above and selecting PROPOSER. RPS can be accessed from the PROPOSER's page. The response will include instructions as to how to proceed.

Independent of which method of the two entrances to the RPS chosen, the process will, at a minimum, involve the following steps:

1) Preparing the scientific and technical justification, including any figures, and converting to a postscript file.

2) Providing the information for, and completing, the Cover Page, the General Page, and the Target Form(s).

3) Verifying that the information on the Cover Page, the General Page, and the Target Form(s) is correct.

4) Submitting the Cover Page, the General Page, and the Target Form(s), which will, in turn, provide the proposer with a proposal number.

5) Submitting the science and technical justification.

The proposer should note , in addition to the mandatory forms, there are two optional forms:

1) a Target Constraints Form and

2) a Target Remarks Form.

More detailed information concerning the Chandra RPS system may found in the Chandra *Proposer's and Observatory Guide* (<http://asc.harvard.edu>)

Chandra Calibration, Cycle 1 GTO and GO, and Cycle 2 GTO Targets

The present *Chandra* observing program consists of Calibration targets, Cycle 1 GO and GTO targets, TOO and DDT targets, and Cycle 2 GTO targets. These are listed in the *Chandra* observing catalog (ObsCat) and on the WWW. Both sources may be accessed through the WWW at:

http://asc.harvard.edu/

Both lists may be browsed to find targets of interest. The information is complete and includes all instrument parameters and up-to-date target lists. The ObsCat is a Java-based WWW program and may require downloading a plug-in before use. The listing at:

http://asc.harvard.edu/targets/

is somewhat easier to access and shows approximate sky-overlays for most scheduled targets.

There are several WWW ASCII lists which may be accessed by clicking on ``Target Lists and Scheduling Information"; then ``Cycle 1 Targets" or ``Cycle 2 GTO Targets" or ``Cycle 2 Calibration Targets."

F EDUCATION/PUBLIC OUTREACH (E/PO) PROGRAM

F.1 Scope of Program

The Office of Space Science (OSS) has developed a comprehensive approach for making education at all levels (with a particular emphasis on K-14 education) and the enhancement of public understanding of space science integral parts of all of its research missions and programs. To this end, OSS invites and encourages all proposers to this NRA to include an Education and Public Outreach (E/PO) component in their research proposals. In addition, anyone holding an existing multiple year research award already funded through any previous OSS NRA is encouraged to propose an E/PO supplement to their award (see details below). The two key documents that establish the basic policies and guidance for all OSS E/PO activities are a strategic plan, entitled *Partners in Education: A Strategy for Integrating Education and Public Outreach Into NASA's Space Science Programs* (March 1995), and an implementation plan, entitled *Implementing the Office of Space Science (OSS) Education/Public Outreach Strategy* (October 1996). Both of these documents may be obtained by selecting *Education and Public Outreach* from the OSS homepage at http://spacescience.nasa.gov , or from Dr. Jeffrey Rosendhal, Office of Space Science, Code S, NASA Headquarters, Washington, DC 20546-0001.

The following policies and guidelines apply to the E/PO activities solicited through this NRA:

- The proposed E/PO activity is expected to have general intellectual linkage to the science objectives of its "parent" proposal and/or the science expertise of its PI;
- An E/PO activity may be funded only as an add-on to a new or an existing award for a "parent" research proposal; therefore, the period of performance of the E/PO activity is restricted to that of its parent award;
- Up to $10K per year may be proposed for an E/PO program, although larger budgets may be considered for a few exceptionally meritorious activities (Note: a Budget Summary must be submitted as part of an E/PO proposal as described further below);
- NASA requests (but does not require) that the submitting organization waive PI labor costs and its customary overhead charges on an E/PO budget, since in many cases such activities will directly aid a local educational or public science institution, and the budget available for this OSS E/PO program is extremely limited;

- The parent research proposal may identify an additional Co-Investigator who, along with the PI of the parent research proposal, will be responsible for completing the E/PO activities (e.g., an appropriately qualified colleague from the PI institution, or from an educational institution such as a public school district, science museum, planetarium, etc.);
- E/PO proposals will be evaluated (see criteria below) by appropriately qualified scientific, education, and outreach personnel, and the substance of these reviews will be conveyed to the proposers in a summary report; and
    - The OSS Selecting Official will take into account proposed E/PO tasks and their review ratings when deciding on final selections and funding levels and as an aid in discriminating between highly qualified research proposals having otherwise comparable merits.

F.2 Evaluation Criteria

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IMPORTANT NEW INFORMATION

OSS has developed a document, entitled *Explanatory Guide to the NASA Office of Space Science Education and Public Outreach Evaluation Criteria*, as a resource for proposers who want to submit an E/PO proposal in conjunction with their research proposal. This *Explanatory Guide* may be accessed through the OSS homepage Web site indicated above or directly at http://www.hq.nasa.gov/office/oss/education/guide.html/ ; navigation through this *Explanatory Guide* at its Web site is facilitated by internal active links. This *Guide* is not an extension of the E/PO requirements or criteria but is meant to provide an easy-to-follow introduction to this program using a series of Frequently Asked Questions (FAQ), followed by a detailed discussion of the E/PO review criteria given below. All proposers who are considering the submission of an E/PO proposal but who are not familiar with the specific OSS standards for E/PO activities are urged to review this *Explanatory Guide*.

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Based on the OSS E/PO strategy and implementation plans noted above, there are two classes of evaluation criteria against which proposed E/PO activities will be evaluated. Although creativity and innovation are certainly encouraged, note that neither of these sets of criteria concerns the originality of the proposed effort. Instead, NASA seeks assurance that the proposer is personally committed to the E/PO effort and that the PI of the parent proposal and/or appropriate research team members will be actively involved in carrying out a meaningful, effective, credible, and appropriate E/PO activity; that such an activity has been planned and will be executed; and that the proposed investment of resources will make a significant contribution towards meeting stated OSS plans and objectives (interested proposers to this E/PO program are urged to consult the *Explanatory Guide* referenced above).

General Criteria

The following general criteria will be applied to the evaluation of all proposals and reflect requirements necessary for further consideration by NASA OSS of an E/PO proposal:

- The quality, scope, and realism of the proposed E/PO program including the adequacy, appropriateness, and realism of the proposed budget;
- The capabilities and commitment of the proposer and the proposer's team to carry out the proposed E/PO program, including the direct involvement of one or more science team members in overseeing and carrying out the proposed E/PO program (Note: this criterion is intended to preclude proposals that serve only to "pass through" money to an external organization or individual who would carry out the proposed E/PO activity, since such a case is inconsistent with the intention of OSS that the research community be actively involved in education and public outreach);
- The establishment or continuation of effective partnerships with institutions and/or personnel in the fields of educational and/or public outreach as the basis for and an integral element of the proposed E/PO program; and
- The appropriateness of plans for evaluating the effectiveness and impact of the proposed education/outreach activity.

Specific Criteria

To ensure that the goals and objectives of the OSS E/PO strategy are realized in practice, E/PO proposals will also be evaluated using at least one of the following specific criteria, as appropriate, for the submitted proposal. Because of the modest financial scope of this program, not all E/PO proposals can (or even should) address all of these specific factors; a sound, well-posed, and focused effort that will clearly be effective in reaching its intended target audience is preferable to an unrealistically broad effort. These specific criteria are:

- For proposals dealing directly with or strongly affecting the formal education system (e.g., teacher workshops or student programs carried out at public institutions such as science museums and planetariums), the degree to which the proposed E/PO effort is aligned with and linked to nationally recognized and endorsed education reform efforts and/or reform efforts at the state or local levels;
- The degree to which the proposed E/PO effort contributes to the training, involvement, and broad understanding of science and technology by underserved and/or underutilized groups; and/or
- The potential for the proposed E/PO activity to expand its scope by having an impact beyond the direct beneficiaries (e.g., reaching relatively large audiences, being suitable for replication or broad dissemination, and/or drawing on resources beyond those directly requested in the proposal).

F.3 Options for E/PO Proposals

OSS expects that most E/PO proposals will be submitted by a single proposer as a supplement to a single science proposal submitted to one of the program components in this NRA. However, NASA OSS will allow two special options to this baseline pattern as discussed below (Note: as a departure from previous OSS NRA's, the so-called "Institutional" E/PO proposal option is no longer offered).

F.3.1 Submission of the Same E/PO Proposal with Multiple Research Proposals Submitted by the Same Proposer

OSS recognizes that a single proposer may submit more than one research proposal to different research components as defined in this NRA (see the summary cover letter and Appendix A). In such a case, that one proposer may submit the same E/PO proposal with all his/her research proposals subject to the three conditions that: (i) OSS will review such an E/PO proposal only the first time it is submitted; (ii) this one evaluation will carry through to all other submissions of that same E/PO proposal for this NRA as well as all other OSS NRA's to be issued in CY 2000; and (iii) such an E/PO proposal will be funded only once (i.e., NASA will not fund the same activity more than once even though it may be enhanced by such an increase in support). The Web page to be used for the submission of an E/PO proposal (see further below) will request information regarding the first submission and any subsequent submissions of this proposal to this NRA. Note that in such a case, the E/PO proposal must be resubmitted in the identical form as it was the first time; OSS does not have the resources to separately evaluate E/PO proposals that have only minor changes between such multiple submissions. Of course, multiple but substantially different E/PO proposals submitted by the same proposer will receive individual evaluations.

F.3.2 Submission of an E/PO Proposal as a Supplement to an Existing Multiple Year OSS NRA Award

In addition to PI's selected through this NRA, OSS also wants to encourage holders of existing awards to become involved in E/PO activities. Therefore, any PI of an existing multiple year award selected through any OSS NRA (including this one) having at least one year remaining in the award's period of performance may submit an E/PO proposal as a supplement to that “parent” research award. The period of performance for such a supplemental E/PO activity is limited to that of the parent research award. Such a supplemental E/PO proposal must be prepared and submitted as a stand-alone proposal following the format and guidelines given below in Section 10.5.

The deadline for the submission of such an E/PO supplemental proposal is the same month and day as the NRA through which the parent proposal was selected (if there are any questions, contact the relevant Discipline Scientist for that program component). Such supplement proposals will be reviewed using the criteria given above, and, if accepted, the E/PO funding will start on the anniversary date of the parent award.

F.4 Assistance for the Preparation of E/PO Proposals

To help interested proposers in developing a effective E/PO proposals, NASA OSS has established a nationwide infrastructure of space science education/outreach groups to directly aid space science investigators in identifying and developing high quality E/PO opportunities. This infrastructure provides the coordination, background, and linkages for fostering partnerships between the space science and E/PO communities, and the services needed to establish and maintain a vital national, coordinated, long-term OSS E/PO program. The two elements of this system of particular interest to researchers interested in submitting E/PO proposals are:

- Four OSS science theme-oriented "E/PO Forums" that aid OSS in organizing the comprehensive education/outreach aspects of OSS space science missions and research programs, and provide both the space science and education communities with ready access to relevant E/PO programs and products; and
- Five regional "E/PO Broker/Facilitators" that search out and establish high leverage opportunities, arrange alliances between educators and OSS-supported scientists, and help scientists turn results from space science missions and programs into educationally-appropriate activities suitable for regional and/or national dissemination.

Prospective proposers are strongly encouraged to make use of these groups to help identify suitable E/PO opportunities and arrange appropriate partnerships and alliances but should note that the responsibility for actually developing the E/PO program and writing the proposal is that of the proposer. Points of contact and addresses for all of these E/PO Forums and Broker/Facilitators are found by opening *Education and Public Outreach* from the menu of the OSS homepage at http://spacescience.nasa.gov .

F.5 Preparation and Submission of an E/PO Proposal

To aid interested proposers in composing and submitting a complete E/PO proposal, NASA OSS has established a comprehensive electronic form that is accessed through menu on the Web site http://www.lpi.usra.edu/panel/ . Completion of all the fields of this electronic form with the requested information and text is necessary before a proposal may be submitted for evaluation (Note: only electronically submitted E/PO proposals will be evaluated). This site may be accessed at any time up to the due date for each of the proposals as given in the cover letter of this NRA, and by using a unique identification number that will be provided at the time of first access, all fields may be edited up to final submission. The requested information may be transferred from any standard word processing software, although only text may be used to complete these fields on this Web site; i.e., this site will not accept illustrations or drawings. As an aid in developing the required information for the final electronic submission, this E/PO format may also be printed at any time.

This Web submission also requires a summary of the E/PO budget (both total and by year) using the same format shown for the research Budget Summary form shown in Appendix C.6 in this NRA. As a change from previous practice for E/PO proposals, it is no longer necessary to integrate the E/PO budget with that of its parent research proposal; however, for new proposals it is still necessary to state the summary E/PO budget (in total and by year) on the proposal *Cover Sheet* (see Section C.5.2).

Once it is submitted, the completed E/PO proposal (including all Budget Summary sheets) can then printed out from the Web site by the proposer to provide the appropriate hard copy for submission either with their parent research proposal, or as a separate supplemental proposal if it is being submitted as an addition to an existing award (see above).

F.6. Reporting Activities for Approved E/PO Proposals

In order to assist OSS in obtaining a coherent picture of the entire portfolio of E/PO efforts supported across all OSS programs a brief report of selected E/PO activities are to be provided as part of the annual Progress Reports required for the parent research award (Note: it is expected that all such Progress Reports for the proposals selected through this NRA will be submitted electronically through a to-be-designated Web site). In addition, one of the OSS Education Forums (see above) will contact the PI's of selected E/PO components to obtain basic summary information concerning the nature of and intended audience for their selected E/PO effort.

F.7 Additional Information

General questions about this E/PO program may be directed to:

Dr. J. David Bohlin
Research Program Management Division
Code SR
Office of Space Science
National Aeronautics and Space Administration
Washington DC 20546-0001
Telephone: (202) 358-0880
E-mail: david.bohlin@hq.nasa.gov

Finally, attention is also called to the Initiative to Develop Education through Astronomy and Space Science (IDEAS) program administered by the Space Telescope Science Institute (STScI) on behalf of OSS. The IDEAS program is open to any space scientist based in the U.S. regardless of whether or not they hold a research grant from NASA OSS. This program, which selects proposals yearly, provides awards of up to $40K to foster the development of innovative approaches to space science education and outreach by space scientists and their educator partners. The annual solicitation for the IDEAS program is typically released in July with proposals due in October. The annual request for proposals is posted at. Inquiries may be addressed by E-mail to IDEAS@stsci.edu or by postal mail to: IDEAS Program, Office of Public Outreach, Space Telescope Science Institute, 3700 San Martin Drive, Baltimore MD 21218.